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G.O. No. 925 Education

Dated 19.4.1948.

[Despatch Abstract.]

D.O. No. 487.
SHRIMATI MIRA BEHN,
Honorary Adviser to Government.

P.O. Rishikesh,
District Dehradun,
January 19, 1948.

W.7.

Dear Friend,

You may be surprised to receive the Proceedings of a Compost Conference, but if you will look at page 7, para 4(c), you will understand why I am troubling you with it. I have marked with a red pencil the most important passages in the Proceedings, and if you will glance through them, you will see the tremendous potentialities of compost in India and I am sure you will agree with me that our village schools are the ideal medium through which to develop the composting habit. From the view of education it can be used as the vehicle for training in sanitation and thrift, and at the same time, scientific knowledge of the soil can be taught through it. In short composting means scientific rejuvination of our soil and the cleaning up of our villages.

I would suggest that every village school should have a small compost pit for demonstrating farm-yard compost, and also trench latrines and trench urinals.

We are having a sub-committee meeting next month on the subject of the best treatment of village night soil and urine, when we shall prepare a detailed scheme which I will send you later.

Yours sincerely,

(Sd) Mira Behn).

To

The Minister of Education, Madras Province, Madras.

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No. D. 353/48/E.II.
GOVERNMENT OF INDIA,
Ministry of Education.

New Delhi, 17th March 1948.

From

The Secretary to the Government of India.

To

All Provincial Governments and Local Administrations.

Sir,

I am directed to forward herewith a copy of Resolution IV(c) of the proceedings of the Conference on Compost and to request that if there be no objection the action taken thereon may kindly be intimated to the Government of India in due course.

2. A printed copy each of the notes which contain information on composting, and may be useful in giving necessary information to village schools on the subject, is enclosed herewith.

Your most obedient Servant,

(Sd) x x x x

For Secretary.

ALL INDIA CONFERENCE ON COMPOST.

On the initiative of Shrimati Mira Behn, a conference of Provincial Workers and others interested in the Compost Programme was held in the Secretariat Buildings. New Delhi on the 16th and 17th of December 1947.

The following delegates attended the Conference:-

1. The Hon. Dr. Rajendra Prasad, Minister for Food and Agriculture, Government of India (in the Chair).

2. The Hon. Raj Kumari Amrit Kaur, Minister for Health, Government of India.

3. The Hon. Pandit K.D. Malaviya, Minister for Developme United Provinces.

4. Mr. S. Basu, I.C.S., Secretary, Ministry of Agriculture, Government of India.

5. Sardar Datar Singh, Vice Chairman, Indian Council of Agricultural Research.

6. Shrimati. Mir Behn, Rishikesh (U.P.).

7. Shri. B.M. Pipland, Deputy Secretary, Ministry of Agricult Government of India.

8. Mr. K.D. Bhatia, I.C.S., Development Commissioner, United Provinces.

9. Mr. Shiv Kumar Sharma, Bijnor (U.P.).

10. Shri. Dharm Pal, New Delhi.

11. Dr. C.N. Acharya, Chief Biochemist to Government of India.

12. Dr. Das Gupta, Health Department, Government of India.

13. Mr. Puri, Transport Department, Government of India.

14. Dr. B.N. Lal, Provincial Biochemist, United Provinces.

15. Dr. K.G. Joshi, Provincial Biochemist, Central Provinces and Berar.

16. Shri. G.L. Patil, Compost Officer, Bombay Government.

The Conference was opened by the Hon. Dr. Rajendra Prasad.

Sardar Datar Singh, Vice Chairman, Indian Council of Agricultural Research, in welcoming the delegates and requesting Dr. Rajendra Prasad, Minister for Food and Agriculture to open the Conference mentioned that a s a result of researches carried out under the auspices of the Indian Council of Agricultural Research at Bangalo a suitable progress was worked for the composting of town Refuse in India; and this scheme which is now supervised by the Government of India, is operating at 600 municipal centres in India producing about 5,00,000 tons of compost per year but the scope for extending the work is immense, since there are nearly 4,000 towns in India which can produce about 100 lakh tons of manure. In the villages a good portion of dung is wasted as fuel, while we are losing nearly Rs. 100 crores in importing food-stuffs from abroad. A portion of the above sum if it had been spent in increasing the quantity of manure prepared in villages would have not only met or food requirements but would hav also improved the fertility level of our soils.

There are hudge quantities of cow dung going to waste/cities, gowshalas and grazing areas. The Sewage and Sludge available in our towns is not being utilised for increasing our agricultural production. It soulds bad economics to leave our resources undeveloped while we continue to import increasing quantities of Chemical fertilizers and fof d food stuffs year by year. The progress achieved far by our urban and village compost schemes represents barely 1 to 2 per cent of our potential resources and all our attention should be concentrated in the first instance on developing the above resources as rapidly as possible.

DR. RAJENDRA PRASAD.

The Hon. Dr. Rajendra Prasad said:- It is a matter of great pleasure to me to preside over this conference. We have had various experiments in the past with different kinds of manure which will help to Grow More Food. Whatever may be the individual merits of different kinds of manure, there is one thing that is sure about for yard manure, viz., that it not only helps to improve yields, but also keep up the fertility of the soil through the humus added. As such there is no question that farm-yard manure is one of the best forms of manure to be used. There is also this much to be said in its favour that it can easily be made. We do not require big factories or large land for this purpose. It gives wealth with little effort if only we knew how to utilise all that is wasted to-day, like waste time, waste of energy, waste of material, waste of food, and last but not least the waste of what we call waste, a great amount of our problem will be solved.

Sarda r Dater Singh has given you figures with regard to the amount of Compost being prepared at present, but up-till-now we have touched only the fringe of the problem. We have been using farm yard manure from time immemorial but we have not yet realised the importance of every bit of cow dung wasted. I am told that not more than one third of the dung is being tuilised as manur the remainingtwo-thirds, being either burnt as fuel or otherwise wasted. If the remaining two-thirds could also be utilised, we could meet our manurial requirements without any difficulty. The question is how we can do it. Cow-dung is now being used for fuel not because our people do not know its use as manure but because they have no other alternative. If we can given them some alternat fuel, I think, a great amount of cow dung can be kept for manurial purposes. Attempt have been made in certain places to have quick growing trees which would give us fuel, but it requires land for growing the trees and we have to wait for several years before the trees become fit to be used f as fuel. My own idea is that as an alternative, we should devote some of the cultivated land for growing crops whose stems can be used for fuel, e.g. castor, maize, cotton and even sugarcane. Our Agricultural Departments should carry out research to find out such crops as would give us fuel as well as fodder and food. Arhar (tur) is an example of such a crop.

There are other things which require our attention. Cattle urine is wasted almost wholly at present. Simple methods of absorbing absorbing the same in ash or earth should be introduced in villages. Attempts should be made to conserve human excreta in villages by opening trenched latrines. Village Co-operative Societies may very well undertake this work. Village bhangis can make a living out of the sale of the manure produced. In cities, the problem is some what different. All the refuse should be converted into compost. The problem of the utilisation of cow dung accumulating in the cities is essentially a problem of transport.

The work detailed above has got to be carried out mainly by the Provincial Governments. Taluka Committees and village committees should be made to supervise the work proceeding in their respective areas. Pandit K.D. Malaviya recently inaugurated a Compost Week in the United Provinces under which each village

was asked to dig at least one trench and fill it up with compost. Similar propaganda drives would have to be organised in every Province. This is a type of work falling in line with the people and easily accepted by them once the Government is able to convince the people of the advantages of compost making. The Government of India is prepared to back up the propos that may be put up by the Provinces for the above object.

SECOND DAY'S PROCEEDINGS

The Conference resumed its session at 9 A.M. on the 17th December 1947, with Sardar Datar Singh, Vice Chairman., Indian Council of Agricultural Research, in the Chair.

The conference formed a Central Compost Development Committee consisting of non-officials and officials with Dr. C.N. Acharya, Chief Biochemist, Ministry of Agriculture as Secretary, which could act as an advisory body to the Central and Provincial Governments in the matter of Compost Development. A number of resolutions were passed urging on the Central and Provincial Governments to accelerate the present rate of production of compost from urban and village refuse material. It was estimated that a complete utilisation of our indigenous resources would yield nearly 300 million tons of additional manure which would give us abo 12-15 million tons of extra food-grains and also proportionate quantities of fodder for cattle. This would help to meet the present estimated deficit of 4-5 million tons of food stuffs in the country.

During the course of the discussion, the Hon. Pandit Malaviya mentioned that a compost drive has been started in the United Provinces which is expected to yield an extra 48 million tons of compost. Dr. Acharya pointed out that the Chief limiting factor for increasing compost productio at present (especially of urban compost was transport and motor trucks were in short supply for the purposes. Mr. Puri of the Transport Ministry promised to give necessary help of his Ministry in securing the supply of motor trucks for the purpose.

The members of the Conference later met Mahatma Gandhi in the afternoon. Mahatma Gandhi gave his blessings for the success of the work undertaken by the Conference and while doing so humerously remarked that a good work needs no blessings from him, but if the work was bad, he should not bless it and his blessings would turn into curses.

The following is the text of the resolutions passed by the Conference:-

1. This Conference is of the definite opinion that the Compost Programme offers vast potentialities for increasing food production in the country; thus a systematic utilisation of urban wastes would yield about 10 million tons extra manure; similarly a more efficient utilisation of our village wastes would add a further 100 million tons of manure, while a programme for providing alternative fuel in place of cow dung would relea another 200 million tons of manure; an implementation of the above programm would thus result in the production of an extra 310 million tons of manure would would our food production by about 12-15 million tons per year as against our present estimated deficit of 4-5 million tons and at the same time provide additional fodder and help to improve the fertility level of our soils.

II. This Conference has reviewed the work carried out so far under the existing schemes for Composting urban and village refuse and feels that while the work has shown steady development during the last three years, the results achieved so far which represent only 1-2 per cent of the total potential capacity should be considered insignificant; and it urges on the Provincial Governments the need for accelerating the pace of the existi schemes, so that :-

(a) under the urban compost scheme, all municipalities notified areas and town committees are brought under the scheme within the next two years and developed to their full production capacity; and

(b) under the village compost scheme, at least 10% of the total

number of villages in the Province are taken up during 1948-49 and an additional 10% are taken up in each succeeding year.

III. In regard to the Town Compost Scheme, this Conference makes the following recommendations:-

(a) In view of the present food situation, it should be made obligatory on all municipalities, notified areas and town committees that they should convert the whole of their refuse material into compost and for this purpose the facilities required by/procurement of transport, etc should be provided by the Provincial Governments; and the municipalities or notified committees should be prohibited from selling uncomposted refuse or night soil to farmers.

/ them by way of expeditions acquisition of land,

(b) The Health Department of the Government of India are requested to issue a directive to Provincial Governments (local Self Government and Health Departments) recommending to them the adoption of the Compost System in preference to other methods of disposal of refuse and strongly urging prohibition of sale of uncomposted night-soil or kat-chara to farmers.

(c) For the disposal of the compost prepared in town areas the help of multi-purpose Co-operative Societies or Taluks Development Associations or similar existing bodies near town centres should be railed of, more actively than at present.

IV. Regarding the Village Compost Scheme, the Conference recommends that:-

(a) The scheme should preferably be operated through Village Panchayats, Kisan Sabhas or Village Co-operative Societies; and in order to help such village organisations with technical advice, demonstrations and training in compost-making and also for the purpose of sending periodical reports, a Compost Supervisor should be posted for each group of 10 villages.

(b) Where the villagers possess insufficient or no land for preparing compost, a common land should be acquired by Government for the purpose in the immediate vicinity of the village.

(c) In order to popularise the composting habit among the younger generation of villagers, a practical course in composting should be included in the syllabus in all primary and secondary schools situated in villages; and demonstration pits should be kept in routine operation in each schools.

V. The Conference considered in detail the problem of conservation of village night-soil and urine and recommended in /this/ this connection that simple dry methods should be adopted for this purpose; and appointed a sub committee consisting of Shrimati Mira Behn, Shri. Shiv Kumar Sarma, Dr. B.N. Lal and Dr. K.G. Joshi (with Dr. B.N. Lal as Convenor) to prepare an outline scheme which could be recommended to Provinces.

VI. This conference desires to draw special attention to the huge stocks of cow dung that lie unutilised in grazing areas, goshalas and cities and urges that special schemes should be drawn up and operated by Provincial Governments for utilising the above stocks;

VII. In addition to the schemes mentioned above, the Conference recommends that suitable schemes should be drawn up and operated in each Province for:-

(a) the agricultural utilisation of town sewage, sullage and sludge;

(b) the utilisation of the by-products of the slaughter house and other trade wastes, e.g. wool wastes, mill wastes, leather wastes, etc; and

(c) for the composting of other materials like water-hyacinth, sugar-

cane trash, press mud, forest leaves, etc in cases where village co-operative societies or individuals do not come forward to utilise the above materials, it would be advisable to prepare the compost under Government auspices till non-official agencies take it up

VIII. This Conference is of the opinion that transport has been the Chief limiting factor for rapid expansion of the compost scheme and urges on the Government of India and on Provincial Governments to give all necessary help to composting organisations in getting sufficient number of motor trucks for the purpose.. It also strongly urges that the trucks at present in use by different Government Departments should also be utilised whenever possible for compost distribution. Transport by canal may also be considered wherever possible.

IX This Conference urges that intensive propaganda should be carried out among farmers to point out the value of compost manure and for this purpose it urges on the Central and Provincial Governments to arrange for carrying out the above propaganda through the medium of ballads, dramas, radio talks, lantern slides, films, posters, pamphlets exhibition stalls, demonstration plots, lecture tours, etc Existing field publicity van newspapers, journals and other media shou also be utilised for this purpose.

X. In order to implement the above recommendations and expande programme of work, the Conference recommends that:-

(a) an All India organisation known as the Central Compost Development Committee consisting of non-officials and officials and comprising the delegates attending this Conference, as a nucleous, wit Dr. C.N. Acharya as Secretary, be formed, which would act as an advisory body to the Central and Provincial Governments and meet periodically in different provinces for the purpose.

(b) Each Province should have a Compost Development Officer who would be in charge of the urban and rural compost work and allied manurial schemes in the Province, including the distribution of fertil sers and oil cakes; and the staff at the All India Headquarters should also be adequately strengthened in order to cope with the expanded programme.

(c) In view of the importance of the Compost Programme sufficien funds should be allocated by the Central and Provincial Governments fo implementing the above recommendations and for this purpose, the schem already included under the five-year development plans have to be suit bly amended.

PREPARATION OF COMPOST MANURE FROM TOWN WASTES.

By C.N. Acharya, D.Sc.(Lond.) M.Sc. Ph.D.; F.I.C.
(Chief Biochemist, Department of Agriculture, New Delhi).

(Fifth Edition, July 1946).

The present urgent need for increasing food production in the country has brought to the force-front the necessity for increasir the supply of manure available for agricultural purposes. In view of low yield per acre of crops obtained in India, which is often ½ to ¼ what is obtained in agriculturally advanced countries, the increased applications of manure to the land would appear to be the most promis way of obtaining increased crop production in the immediate future. T most important source of manure at the present time is farmyard manu but for well known reasons, the total quantity available is inadequa to meet agricultural demands. The supply of other organic and inorg manuressuch as oil-cake, fish-meal, mineral fertilizers, etc forms a comparatively small affairs quite insufficient to make up the preser deficiency in the supply of manure.

A major source from which a large quantity of good qualit

manure could be obtained lies in the refuse of urban areas, administered by Municipalities and bigger village panchayats, which maintain sanitary staff for the collection of town wastes such as dustbin, refuse, street sweepings, night-soil, slaughter house-wastes, sewage, sullage, sludge, etc. The above waste-materials contain good amounts of fertilizer ingredients which at present literally go to waste, being either dumped in pits or incinerated. By a proper system of biological fermentation, known as the "Compost Process",it would be possible to prepare and supply from the above source nearly one crore of tons of valuable manure, helps also to improve sanitary and hygienic conditions in our towns and villages in as much as no scope is left for waste material to accumulate in the raw condition, leading to smell and fly nuisance; all such material is rapidly decomposed to an inocuous condition in the process of compost making.

What is Compost? "Composting" could be defined as a process of biological fermentation of bulky organic refuse conducted so as to yield a manure of agricultural value; and is an old art which has been in use among agriculturists, on an empitical basis, for centuries past. The scientic principles underlying the composting process were first clearly enunciated by Hutchinson and Richards, during their investigations at Rothamsted, which resulted in the development of the Adco Process (1920) A great deal of interest and scientic work has been concentrated by Sir Albert Howard (1930), of the Activated Compost Process by Dr. Gilbert Fowlder (1930) and of the Bangalore Process by Dr. C.N. Acharya (1940).

The essential requirements for successful composting are:-(a) the presence of bulky organic refuse, which may be either town-refuse (dust bin refuse) and street-sweepings) or mixed vegetable refuse of farms (e.g litter, weeds, stubble, crop ridisudes, etc); (b) the addition there-to of a suitable nitrogenous material known as the 'starter', in adquate quantities, e.g. night s-oil, sewage sludge, slaughter-house wastes, cattle-dung, urine, etc; or inorganic nitrogenous substances such as calcium cyanamide, ammonium sulphate, etc; (c) the addition of enough water to keep the moisture content of the compost heap at a level round about 50 per cent; and (d) the presence of a sufficient supply of air, especially in the initial stages of decomposition. The refuse materials listed under classes (a) and (b) above are oft n not in a fit condition for direct application to the land as manure. Those grouped under clause (a) possess generally a wide C/N ratio and act adversely on crop growth by decreasing the supply of available nitrogen in the soil. Those listed under class (b) often possess serious sanitary and hygienic objections in the matter of smell, fly-breeding and development of pathogenic organisms (c.f. night soil, slaughter house wastes, urine, etc). When materials of group (a) and (b) are suitably admixed so as to satisfy conditions of C/N ratio, moisture and aeration, very rapid development of micro-organisms (predominantly fungi in the early stages and bacteria in the later stages) takes place, attended by the production of considerable heat, which may exceed 60 C (150 0 F). The heat, which may may be taken to be a measure of total microbial activity, generally raches a maximum level in the first week and then tends to fall down very slowly over a period of several weeks. The resulting compost-manure is ready for application to land when its C&N ratio narrows down to a level of 12: 1 or less.

The various methods of composting proposed from time to time have much in common in respect of C/N ratio and moisture requirements; the main variation among them has lain in special attempts made in individual methods to hasten the speed of decomposition by means of increased aeration and turnings given to the compost.mass (c.f. the Indore Process or the Activated Compost Process). Such turnings and increased aeration given to the mass help no doubt to break down the compost in a short time to a powedery condition, but they are accompanied by a number of serious draw-backs, such as:- (a) considerable increase in labour charges and consequently in the [illegible] price of the manure; (b) rapid drying out of the compost-mass and the need for fresh addition of water every time a turning is given; (c) heavy losses of nitrogen due to increased aeration during the operation of turnings; and (d) increased losses of organic matter and consequent low recovery of manure.

It would be seen that the above economic and chemical draw backs associated with "turnings" and excessive aeration, more than out weigh any possible advantages by way of rapidity of decomposition, especially in the light of the fact that over vast areas of this country the demand for manure comes in only once in six months or even once a year in the Kharif or Rabi season. In view of the limited resources of the Indian farmer and his inability to pay a high price for his manure, it is necessary that the method of composting; to be successful in this country, should be simple, should minimise labour and watering charges as much as possible by avoiding turnings, and at the same time yield the largest quantity of manure of good quality. Most of the above requirements are fulfilled by the Bangalore Process of Compost-making, which avoids turnings altogether and thus brings down labour charges considerably, bu lays great emphasis on the initial C/N ratio of the compost heap and the initial moisture conditions. A note giving details of this method as recommended for the treatment of Municipal refuse is given below:-

COMPOSTING PROCEDURE FOR MUNICIPAL WASTES.

The site selected for the Compost Depot should be at least two furlongs away from the outskirts of the town, through it is possible to carry on composting without creating any nuisance even when the Depot is nearer, provided the compost-making is carried out under proper supervision and in strict conformity with the instructions given below. The site should, preferably, not be situated on the western side of the town, since the wind generally blows from west to east most part of the year. It is inadvisable to have the Compost Depot more thanhalf a mine from the outskirts of the town, as transport of refuse and night soil to the Depot then becomes expensive and difficult. In the case of bigger cities it is advisable to have two or more Compost Depots situated on different sides of the town, so that the distance to be covered by the refuse and night soil carts may be lessened. The production capacity of each Depot should however be not less than 2,000 tons (100,000 cubic feet) per year in order to minimise supervision and labour charges. Each depot should be surrounded by a live-fence (hedge plants clipped close together), 5 to 6 feet.hight.

2. The output of municipal refuse is generally estimated at about ½ to 3/4 lbs. of refuse and about ½ lb. of night soil per head of pupulation per day through there is much variation between different places on account of factors such as industrial activity, local habits, of the people dilution of night-soil with ablution water, etc. For a unit of 10,000 population, it is generally found that about 800-1000 tons of refuse and about 800 tons of night soild (1 ton equal about 220 gallons) are collected on the average per year. The total compost manure that can be prepared by mixing the whole of the refuse and night soil together may be estimated at about 1,000 tons per year per 10,000 population though the production capacity may show considerable variation from place to place, and tends to come down rapidly in centres of less than 10,000 population on account of local habits which permits the municipality to collect from 30% to 50% only of the total quanity of refuse and night soil potentially available from the total population.

3. The following data may prove useful in compost calculations

1 C.Ft. refuse weights roughly 20 lbs., gallon night soil (1/6 Cub. Ft)/10 lbs. Good quality compost-manure prepared from town refuse and night-soil contains about 30-40 per cent moisture, weights about 5-60 #/C.ft. and on the dry basis contains about 1.2 to 1.5% nitrogen and 1% phosphoric acid. A ton of compost-manure contain about 15-18 lbs. nitrogen, 12-15 lbs. phosphoric acid and 300-400 lbs. organic matter, in addition to a good amount of calcium, potassium and minor plant nutrients. On thebasis of 50% availability of plant nutrients alone, the compost would be worth about Rs. 10/- per ton, not taking into consideration the highly beneficial effects, of bulky

organic manure in improving the physical and biological condition of the soil conserving it against erosion, preventing alkalinity and salinity effects, improving aeration and drainage, etc.

4 The composting is preferably carried out in trenches arranged with their lengths perpendicicular to the road, leaving 6 to 7 ft. vacant space between successive trenches. The earth excavate should be heaped along the longer sides, leaving the shorter ends free for refuse or night soil carts to approach the edge and deposit the refuse straight into the trench. The size of the trench would vary with the population and quantity of refuse to be dealt with, but it could be gauged from the fact that from 200 to 250 c.f. ft. of tranch volume would be required per day per 10,000 of population. A batch of 200 tranches would be required for the whole year. Recommended trench dimensions are as follows:-

Population.	Length	Breadth.	Depth.
Below 10,000	15 Ft.	5 Ft.	2½ ft.
10,000 to 20,000	20 Ft.	6 Ft.	3 Ft.
20,000 to 50,000	30 Ft.	7 Ft.	3 Ft.
Above 50,000	35 Ft.	8 Ft.	3½ ft.

At depths greater than 3ft. the decomposition is slow. It is a good plan to dig trenches 6" less than the required depth and to use the excavated earth for raising the sides 6" to 9" higher than the road level. Where the trenches are 30 ft. or longer, it would be necessary to have roads at both ends of the trenches. Where, for financial or other reasons, road s could be laid down only at oneend of the trenches, it would be preferable to have shorter trenches, say 20 feet long. In order to ensure thin alternate layers of 2" or less of night soil in the trenche, it would be advisable to have the surface area of the trench equal to or more in square feet than the number of gallons of night soil added per layer. In special cases, where there is enough space at the Depot and the night soil is of very thick consistency or comes to the Depot already mixed with katchra, compost trenches (30'X 8' X 3') may be laid down parallel to the road.

5. The actual composting procedure is as follows:-First a layer of refuse about 6 inches thick is apread at the bottom of the trench with the long handled rakes and over this is added the calculated quan of night soil corresponding to a thcickness of 2 inches. Normally the nightsoil does not require spreading and flows by itself, but in case it is hard, it may be spread by means of long handled wooden-fan, phowdas. From the data forthe length and the breadth of the trench and the figures given in para 3 above, it is possible to calculate the number of cart-loads of refuse or night-soil to be added for each layer. Succeeding layers of refuse and night soil are similarly added till the heap rises to a foot above ground level. Each layer of night-soil should be immediately cover over with a 6" layer of refuse but the top layer at the end of each day should be re about 9 inches thick. If loose earth be available, it is a good practice to cover the top of the heap at the end of each working day (whether the trench is half-full or completely full) with a thin layer of earth about 2 inches thick, since this effectively suppresses smell nuisance, conserves moisture bet ter, avoids, nitro losses and minimises considerably fly ruisance. In the case of the bigger towns it would be found convenient to take up 2 or 3 trenches simultaneously for filling, in order to cope with the irregularity in arrival of refuse and night soild carts.

6. In areas where katchra and night soil are collectedtogethe and come loaded in the same carts, the refuse may be put into trenches after proper mixing and moistended with extra water e.g. sullage water. Other town wastes such as slaughter-house refuse

blood washings, sewage sludge, etc may be used in place of night soil, as nitrogenous starter for decomposing katchra, the procedure of camposting being the same as given above.

7. If the proper proportion of refuse to night-soil be maintained in the trenches, a man's legs should not sink when walking over the compost mass at the end of each day. If the legs sinks it show that excess of nightsoil or water is present and hence more of refuse should be added. In a few days time after filling up a trench 2 or 3 days) considerable heat (over 65 o C or 150 o F)should be produced, which can be tested for by inserting thermometer into the mass. This high heat serves rapidly to decompose all the night-soil and refuse and to destroy all pathogenic organisms and fly maggots that may originally be present in the night soil & refuse. At the end 4 to 6 months decomposition, depending on the season, the manure is ready for application to land and the resulting product is found to be a well composted odourless inocuous material of high manurial value superior ordinary farmyard manure.

8. After filling up 20 to 30 trenches, it would be found that the first trench has sunk to a depth of a foot or more below ground-level, in which case further layers of night soil and refuse may be added on top of the above, till the heap rises to a foot above ground-level. Further such additions to the same trench may not be found necessary at later stages, since the rate of sinking becomes much slower after the initial 30 days. In the rainy season, however it would be advisable to raise the level of all the heaps to a foot or so above ground level with refuse and make the top of the heap dome-shaped, and cover with earth, so that rin-water may not collect in the trnehces but may flow out. Where extra refuse is not available, the sides of the trenches should be raised with earthen bunds in order to prevent outside water getting into the trenches. In the rainy season or in areas of high water table, when trench cannot be used, the composting can be carried out in overground plastered heaps, according to the procedure outlined in Miscellaneous Bulletin No. 60 of the I.C.A.R. - vide last para.

9. The labour required for the Compost process may be estimated from the fact that a labourer can deal with about 120 c.f.t. of refuse (about a ton) and 220 gallons of night soil (about a ton) per day. The cost of produduction of manures works out to about annas 12 to Rupee one per ton of compost-manure obtained finally (about 50 c.ft) charging labout at annas 12 to Rupee 1 per day. Compost manure generall fetches a price of Rs. 1-8-0 to 2 per ton. One cart load (25-30 c. ft) of manure weights about half a ton.

10. Compost more than 6 months old can be sold away to cultivate and the trenches which thus become empty can be used over again for preparing fresh compost-manure. Recommended dosages are from 15-20 cart-loads (10 tons) of manure for irrigated crops and 5 to 10 cart-load (5 tons) for dry land crops. It is recommended that the manure should be taken out of the trenches by municipal albour, 10 or 15 days before sale and stored on thebunds. in order to promote drying and final matur tion of the manure. Undesirable materials such as glass, porcelain, brick-bats and metal pieces present in the final manure should be remov while loading the carts by placing ½inch expanded metal sieve on the top of the carts and throwing the baskets of manure over the sieve.

11. Fly bredding:-Where the proper proportion of katcha to night soil is maintained and sufficient heat is generated, very little fly development takes place in the compost trenches, But in the rainy and cold seasons, when the trenches do not pick up sufficient heat, fly counts should be taken periodically over compost trenches and fly control measures (tarred hessian cloth or earth plaster as per details given in Misc. Bulletin No. 60 of the I.C.A.R.) should be applied.

12. Fuller details of the Compost Process and management of Compost Depots are contained in Miscellaneous Bulletin No. 60 of the I.C.A.R. entitled "Preparation of Compost-manure from town wastes", copies of which could be had from the Manager, Government of India Publications, Civil Lines, Delhi.

From

Sri. D.S. Reddi, M.A. (Oxen),
Director of Public Instruction,
Madras.

To

The Secretary to Government,
Education & Public Health
Department, Madras

R.O.C. No. 738/B2/48 dated 19.3.1948.

Sir,

Sub:- Practical composting - Inclusion in the syllabus in schools - Proceedings of the First All India Conference on Compost.

Ref:- Government Education & Public Health Department Memorandum No. 10533/B2/48-1, Education, dated 24.2.1949.

In resubmitting herewith the proceedings of the First All India Conference on Compost, received with the Government Endorsement referred to above, I have the honour to state that it does not seem necessary to specifically include "Practical Composting" in the syllabuses for Elementary Schools. It seems sufficient if instructions are issued that Lessons on "Practical Composting" may be given in connection with "Nature study and Gardening" in the lower elementary stages and under elementary science in the Higher Elementary stages. And in places where facilities are available, the village schools may be required to have a small compost-pit for demonstrating farm-yard compost. On receipt of a reply from Government, necessary instructions will be issued on the above lines.

x x x x

For Director of Public Instruction.

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GOVERNMENT OF MADRAS.
Education & Public Health Department.

Memorandum No. 10533/B2/48-2, Education, dated 5.4.1948.

Sub:- Practical Composting - Inclusion in the syllabus in schools - Proceedings of the First All India Conference on Compost.

Ref:- From the Director of Public Instruction, R.C. No. 738/B2/48 dated 19.3.1948.

The Government agree with the suggestions made by the Director of Public Instruction in regard to the issue of instructions about "Practical composting" on the lines indicated in his letter cited above. He is requested to take action accordingly.

x x x x

To

The Director of Public Instruction, Madras.

GOVERNMENT OF MADRAS.
Education and Public Health Department.

Letter No. 10533/B2/48-3, Education.

From

Sri. M.V. Subramanian, I.C.S.,
Secretary to Government.

To

1. The Secretary to the Government of India,
Ministry of Education,
New Delhi.

2. Srimathi. Mira Behn,
Honorary Adviser to Government,
U.P. Rishikesh Post, Dehradun.

Sub:- Practical composting - Proceedings of the All India Conference on compost.

Ref:- 1. Government of India, Ministry of Education, letter No. D.353/48-E.II. dated 17.3.48.
2. Your D.O. No. 487 dated 19.1.1948 addressed to Hon'ble Minister (Education).

I am directed to say that the Director of Public Instruction, Madras, has been asked to issue necessary instruction for imparting lessons on "Practical composting" in connection with nature study and gardening in lower elementary stages and under Elementary Science in higher elementary stages in all schools and for forming small compost pis for demonstrating farm-yard compost in village schools where facilities are available

on compost:-

1. Methods of preparation of compost from Farm, Urban and Rural Wastes - a pamphlet in Hindi by Dr. C.N. Acharya.

2. Primary lesson on compost which is included in the basic reader of the U.P.

It is requested that you will kindly give wide publicity to this literature which it is hoped will be sufficient to guide school teachers in the proper method of preparation of compost, manure, lay out of compost, pits for demonstration, etc.

Yours faithfully,

(Sd) G.F. Lakhani,

For Secretary.

GOVERNMENT OF MADRAS.
Education and Public Health Department.

Endorsement No. 57579/B2/49-1, Education, dated 2.8.49.

Referred to the Director of Public Instruction for necessary action.

2. His attention in this connection is invited to Government Memorandum No. 10553/B2/48-2, Education, dated 8.4.1948.

x x x x

The Director of Public Instruction, Madras.

....

/True copy/

Office Assistant,
Madras Record Office.

k.y.s.

2. [illegible] G.O. Ms. 925 Edn. Dt. 19.4.48.

Recorded.

Sd. x x x x

True Copy

S. Jagannathan
Office Asst.
Madras Record Office